

BEELINES

Winter 2010

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CROPS

APIVAR RESISTANCE TESTING

In the spring of 2010, many beekeepers treated their hives with Apivar® against Varroa mites. In most cases, beekeepers reported very good mite control in most to all of their colonies; however, in some cases beekeepers noted higher-than-anticipated mite levels after treatment.

Three of these apiaries were investigated for resistance to Apivar®. No resistance was found in any of the investigated cases. Each of the colonies had been treated with two strips in the upper brood chamber in the spring, but it is suspected that the colonies may have outgrown the first brood chamber, making the two strips of Apivar® insufficient at the end of the spring to treat the entire colony.

To avoid under-treating colonies, make sure that there is enough product in the colony for the entire treatment period as described on the label.

Directions on performing a modified Pettis test can be obtained by contacting:

Geoff Wilson
Saskatchewan Ministry of Agriculture
800 Central Ave. Box 3003
Prince Albert SK S6V6G1
Phone: 306-953-2304



Collecting bee samples for Apivar resistance testing.



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DISEASE CONTROL RECOMMENDATIONS FOR MITES (2011)

Note: The following is an overview of the control options for pests and diseases. Read all labels before applying the treatment. The directions on the label are the law. Application methods can change, so label directions take precedence over recommendations provided in this document. At present, there are no control products that can be used during a honey flow.

MANAGEMENT PLANNING

A management plan for mite control that uses multiple treatment tools is important. Using products with different active ingredients reduces reliance on a single product/active ingredient, and will help reduce the development of resistance to a specific active ingredient. After a product is used, test mite levels to determine if the treatment was effective.



A sample of mite-infested bees being tested for Apivar® resistance using a Pettis test.

The following mite control plans should be effective for both tracheal and Varroa mites:

1. Organic acid treatment regimen
 - a. Formic acid in the spring
 - b. Oxalic acid in late fall/early winter.
2. Synthetic and organic acids treatment regimen
 - a. Formic acid in the spring
 - b. Checkmite+™ OR Apistan® OR Apivar® in the fall (never use these products at the same time and check for resistance before using these products).

VARROA MITE (VARROA DESTRUCTOR) CONTROL

Monitoring:

Monitoring, or testing, is becoming essential in mite management. It is important to know the level of mites in your colonies to be able to make appropriate treatment decisions and take appropriate action. Do not treat individual colonies; treat the entire bee yard, if not the entire operation. There are many methods for monitoring Varroa mite levels, and all have advantages and drawbacks. The two most effective and simplest sampling techniques are described here.

1. Alcohol wash

In a jar containing approximately 150 ml of ethyl alcohol, collect a sample of 300 bees from near the brood area of the colony. Shake the bees vigorously for two to five minutes. Place a white cloth over a bucket and a screen over the white cloth. Pour the bees and alcohol onto the screen, allowing the alcohol to drain into the bucket. Rinse the jar with another 150 ml of alcohol and pour that over the sampled bees. Rinse the bees with another 150 ml of alcohol. Look for mites on the white cloth. Adult mites will resemble a flattened, reddish-brown oval, 1 to 1.8 mm long and 1.5 to 2 mm wide. Return the bees to a jar of alcohol and repeat the process until no additional mites are found. The alcohol can be reused for more samples.

An alternative method is to collect the bees in a commercially available mite sampling shaker jar. Shake the jar as directed on the label. The mites and bees end up in separate jars, greatly simplifying the sampling process.

Another alternative is to collect approximately 300 bees in a jar of alcohol and ship it to the honeybee diagnostic lab.

Send samples to:

Geoff Wilson
Saskatchewan Ministry of Agriculture
800 Central Ave, Box 3003
Prince Albert SK S6V6G1

2. Sticky bottom boards

Use a commercially prepared insect trap glue or a 50:50 mixture of shortening and petroleum jelly to coat a 30x40-cm sheet of thick paper. Place the paper sticky side up on the bottom board of the bee colony and cover with a screen. Leave the sticky board in place for one to three days. Remove the sticky paper and count the mites; divide the number of mites by the number of days the sticky trap was in the colony.

Treatment Thresholds:

Current research suggests that the treatment thresholds for Varroa mites are:

Spring:

Three mites in a 300-bee alcohol wash sample, or two mites found on a natural-drop sticky bottom board within a 24-hour period.

Fall:

Six mites in a 300-bee alcohol wash sample, or 10 mites found on a natural drop sticky bottom board within a 24-hour period.

TREATMENT PRODUCTS

Apistan®

(active ingredient: 10.25% fluvalinate)

Treatment window: spring and fall

Strips cannot be applied with honey supers on the colonies. Honey supers can be applied after the treatment is removed.

Remove strips from the package just before application. Do not remove unused strips from the original package. Use one strip for every five frames (or fewer) of bees. The strips should be distributed evenly throughout the brood chamber and need to be in contact with the bees in the brood nest. Remove the strips at the completion of the treatment on day 42.

Caution: Wear chemical-resistant gloves while handling the strips.

Checkmite+™

(active ingredient: 10% coumaphos)

Treatment window: spring and fall

Strips cannot be applied with honey supers on the colonies. Honey supers can be applied 14 days after the treatment is removed.

Remove strips from the package just before application. Do not remove unused strips from the original package. Use one strip for every five frames (or fewer) of bees. The strips should be distributed evenly throughout the brood chamber and need to be in contact with the bees in the brood nest. Remove the strips at the completion of the treatment on day 42.

Caution: Wear chemical-resistant gloves while handling the strips. It is not recommended to treat with Checkmite+™ more than once per year.

Apivar®

(active ingredient: 3.33% amitraz)

Note: Apivar® has been granted an emergency use registration by the Pest Management Regulatory Agency (PMRA) for the period July 1, 2010, to June 30, 2011. The emergency registration expires on July 1, 2011. Beekeepers should watch for updates on registration for the fall of 2011.

Treatment window: spring and fall

Strips cannot be applied with honey supers on the colonies. Honey supers can be applied 14 days after the treatment is removed.

Remove strips from the package just before application. Do not remove unused strips from the original package. Use one strip for every five frames (or fewer) of bees. The strips should be distributed evenly throughout the brood chamber and need to be in contact with the bees in the brood nest. Remove the strips at the completion of the treatment on day 42.

Caution: Wear chemical-resistant gloves while handling the strips.

Mite-Away II™

(active ingredient: 47.65% formic acid)

Note: At the time of writing, Mite-Away II is registered until December 31, 2010; however, the company that produces this product has indicated it will not renew its registration. If the product is not re-registered, remaining product cannot be used to treat colonies after December 31, 2010.

Mite-Away II™ is a single-application pad that is effective on both Varroa and tracheal mites.

Treatment window: spring (mid-May to mid-June) and fall (as soon as the honey supers are removed).

Formic acid treatments must be finished two weeks before honey flow.

Place half-inch spacers on the top bars close to the brood area. Place a Mite Away II™ pad on the spacers. Use a 1½-inch rim between the brood boxes and the cover to allow sufficient space for the pad.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, protective clothing and boots. Avoid inhaling vapours.

Repeated Application Pads
(active ingredient: 65% formic acid)

Note: The note to CAPCO "Proposed Scheduling of 65 Percent Formic Acid for the Detection and Control of Honeybee Mites" (C94-05) will be repealed in March 2011. At that time, all formic acid must be fully registered.

At the time of writing, a submission for repeated application pads of 65 per cent formic acid is expected to be made. With a new registration, the directions of use may change. Beekeepers should watch for updates on the registration and directions for liquid formic acid during the upcoming winter.

Treatment window: spring (mid-May to mid-June) and fall (as soon as the honey supers are removed).

Formic acid treatments must be finished two weeks before honey flow.

Apply 35 ml of a 65-per-cent formic acid solution in an absorbent pad on the top bars of the colony. Repeat the treatment six times at four-day intervals. Some variations (in accordance with CAPCO) may be made to the treatment to improve the efficacy.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, respirators fitted with an organic acid filter, protective clothing and boots.

Oxalic Acid
(active ingredient: >99.6% oxalic acid dihydrate)

Treatment window: late fall and early spring when there is little to no brood in the colony.

Vaporizer Method: Seal all cracks and the upper entrance, and restrict access to the lower entrance of the hive. Smoke bees on the bottom entrance. Place two grams of oxalic acid dihydrate onto the vaporizer and follow the manufacturer's directions to sublimate the oxalic acid in the bottom entrance.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, respirators fitted with an organic acid filter, protective clothing and boots. Do not treat indoors.

For more information on the conditions of use for oxalic acid, go to:
<http://www.honeycouncil.ca/documents/LabelOxalicE.pdf>.

Thymovar
(active ingredient: 15g / wafer)

Treatment window: spring and late summer to early autumn. For optimal efficacy with the least brood damage, maximum daytime temperatures should be between 12C and 30C.

Thymovar may not be applied during a honey flow or when there is surplus honey on the hive.

Singles: Cut wafers in half. Apply half wafers on the frames in each of the two opposite corners of the brood chamber (Note: this is a total of one wafer for a single brood chamber colony). Remove spent wafers after three to four weeks. Reapply Thymovar at the same rate for an additional three- to four-week period.

Doubles: Apply one wafer on the frames in each of the two opposite corners of the top brood chamber (Note: this is a total of two wafers for a single brood chamber colony). Remove spent wafers after three to four weeks. Reapply Thymovar at the same rate for an additional three- to four-week period.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, protective clothing and boots.

**NON-CHEMICAL MANAGEMENT
TECHNIQUES FOR VARROA MITES**

1. Stock Selection

Re-queen colonies with stock selected for Varroa resistance/tolerance.

2. Mite trapping with drone brood (may not be practical on a large scale)

Remove old combs that contain drone brood. Place a plastic frame with drone foundation into the brood chamber and allow the bees to make drones. Remove the comb before the drones have emerged. Scrape the drone brood off the foundation and replace the frame in the colony. Remove the scrapings from the bee yard and render the wax.

Alternatively, freeze the frame for a week to kill the Varroa mites, and return it to the hive for the bees to clean up. This treatment needs to be repeated six to eight times during a season to achieve 80 to 90 per cent efficacy. Do not allow the drones to hatch; hatching drones will greatly increase the Varroa mite levels in the colony.

3. Screen Bottom Boards

Use an 8x8-inch piece of screened hardware cloth to create a bottom board with at least a 1½-inch space below the screen. Screened bottom boards have shown efficacy of zero to 30 per cent.

Note: These boards may slow down colony development in cold climates.

TRACHEAL MITE (ACARAPIS WOODI) CONTROL

Monitoring:

Samples of approximately 300 bees in alcohol can be shipped to the honeybee diagnostic lab to be examined for tracheal and Varroa mites.

Samples should be sent to:

Geoff Wilson
Saskatchewan Ministry of Agriculture
800 Central Ave, Box 3003
Prince Albert SK S6V6G1

TREATMENT PRODUCTS

Mite-Away II™

(active ingredient: 47.65% formic acid)

Note: At the time of writing, Mite-Away II is registered until December 31, 2010; however, the company that produces this product has indicated it will not renew its registration. If the product is not re-registered, remaining product cannot be used to treat colonies after December 31, 2010.

Mite-Away II™ is a single-application pad that is effective on both Varroa and tracheal mites.

Treatment window: spring (mid-May to mid-June) and fall (as soon as the honey supers are removed). *Formic acid treatments must be finished two weeks before honey flow.*

Place half-inch spacers on the top bars close to the brood area. Remove the pad from the outer plastic cover, being sure to leave the inner blue plastic cover with holes surrounding the inner pad. Place a pad on the spacers. Use a 1½-inch rim between the brood boxes and the cover to allow sufficient space for the pad.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, protective clothing and boots.

Repeated Application Pads

(active ingredient: 65% formic acid)

Note: The note to CAPCO "Proposed Scheduling of 65 Percent Formic Acid for the Detection and Control of Honeybee Mites" (C94-05) will be repealed in March 2011. At that time all formic acid must be fully registered.

At the time of writing, a submission for repeated application pads of 65 per cent formic acid is expected to be made. With a new registration, the directions of use may change. Beekeepers should watch for updates on the registration and directions of use for liquid formic acid during the upcoming winter.

Treatment window: spring (mid-May to mid-June) and fall (as soon as the honey supers are removed). *Formic acid treatments must be finished two weeks before honey flow.*

Apply 35 ml of a 65-per-cent formic acid solution in an absorbent pad to the top bars of the colony. Repeat the treatment six times, four days apart. Some variations (in accordance with CAPCO) may be made to the treatment to improve the efficacy.

Caution: Wear appropriate safety gear, including goggles, chemical-resistant gloves, respirators fitted with an organic acid filter, protective clothing and boots.

Menthol

(active ingredient: menthol crystals)

Note: For more information, see the note to CAPCO "Scheduling of menthol for honeybee tracheal mite control": http://www.hc-sc.gc.ca/cps-spc/pubs/pest/_decisions/c92-05/index-eng.php.

Treatment window: spring (mid-May to mid-June) and fall (as soon as the honey supers are removed). *Menthol treatments must be finished two weeks before honey flow.*

Warm shortening to the melting point and mix with an equal amount of menthol by weight. Dip 30x30-cm sheets of corrugated cardboard into the mixture until saturated, remove and cool. Store the sheets in a sealed container in the freezer until they are to be used. Place one sheet of cardboard on the bottom board of the hive and replace it after seven days. Remove the treatment after 14 days.

Caution: Wear appropriate safety gear, including goggles and chemical-resistant gloves. Use in a well-ventilated area.

Saskatraz: Building a Better Bee

(Reprint from AGRIVIEW, September 2010)

Saskatchewan beekeepers are working to build a better bee, one that is gentle, productive and, crucially, resistant to mites and brood diseases.

Honeybees pollinate one-third of the world's food crops, including a yield increase for canola, but they are under threat from the Asian *Varroa destructor* mite, which appeared on North American honeybees in 1987. North American bees had no resistance to the mites, and died in huge numbers. The mites quickly become resistant to chemical treatments, and the treatments prevented the bees from developing a natural tolerance to the mites.

Since 2004, the Saskatchewan Beekeepers Association, with help from the Manitoba and Ontario beekeeper associations and funding from Saskatchewan's Agriculture Development Fund (ADF), has been assembling a large honeybee gene pool at a remote apiary nicknamed Saskatraz in the hope of breeding bees that are naturally tolerant of mites and diseases, as well as being adapted to the Saskatchewan environment.

Queen bee breeders in Saskatchewan and Manitoba provided lead researcher Albert Robertson of Meadow Ridge Enterprises with their best breeding lines to develop Saskatraz. The Saskatchewan and Ontario beekeepers' associations imported mite-tolerant Russian and German bee stock. No chemical miticides were applied, and natural selection was used to identify the most productive, gentle and mite-tolerant strains.

In 2006, Saskatraz started releasing bee families to queen breeders for multiplication, but a mite infestation in 2007 wiped out all of the original Saskatraz colonies. The 2006 lines were out-crossed to enrich the gene pool, and reselected colonies were returned to Saskatraz to continue the search for a better bee.

Despite the setback in 2007, the Saskatraz approach to improving the gene pool has proven successful. Since 2006, Saskatraz has released 14 families (4,220 queen cells and 67 breeder queens) for multiplication. These families have improved honey production, good resistance to tracheal mites and chalk brood and some tolerance to varroa mites. With the help of a new ADF grant, work is continuing to find a varroa-resistant line.

The Agriculture Development Fund provides funding to help institutions, companies and industry organizations carry out research, development and value-added activities in the agriculture and agri-food sector. The results produce new knowledge, information and choices in technologies, techniques and varieties for farmers, ranchers, processors and input suppliers, to improve the competitiveness of Saskatchewan's agriculture sector.

In 2010, the Saskatchewan Ministry of Agriculture provided \$5.7 million for 44 ADF research projects.

For more information on these projects

- Visit the Saskatchewan Agriculture research reports website at www.agriculture.gov.sk.ca/ADF/Search and enter the report number (20050718) into the search function.
- Contact Albert Robertson, Meadow Ridge Enterprises, 306-373-9140 or a.j.robertson@sasktel.net



Working in a beeyard with Saskatraz bee colonies.

SMALL HIVE BEETLES FOUND IN ONTARIO

Small hive beetles were first found in Ontario on September 8, 2010, in an apiary in the southern region. The beetles were reported to Ontario's provincial apiculturist and positively identified by the Canadian National Collection of Insects, Agriculture and Agri-Food Canada (national laboratory). The beetles have since been found in 13 apiaries, with a potential of 324 colonies infected. The apiaries are all located in one county of Ontario. It is suspected that the colonies became infected by beetles crossing the border naturally in swarms or by other natural dispersal, but the true route of infection is still unknown.

The Ontario Ministry of Agriculture Food and Rural Affairs has quarantined the infected beeyards and has conducted a survey to identify additional sites. The Ontario ministry is working with its beekeepers, and is planning additional steps during the winter of 2010/2011 and spring of 2011. The small hive beetle can be controlled using Check-mite+™ inside the colonies as directed on the label. An application has been made to use permethrin insecticide as soil drench to control the beetles in the ground.

At present, there is little impact on Saskatchewan's beekeepers from this infestation.

More information can be found at http://www.oie.int/wahis/public.php?page=weekly_report_index&admin=0&newlang=1

REGISTRATION UPDATE

Beelines is sent to all registered beekeepers in the province.

If you are no longer keeping bees and wish to be removed from the mailing list, contact Saskatchewan Agriculture's Apiculture Office in Prince Albert at (306) 953-2304 (a message containing your name and address can be left at any time) or email the Provincial Apiculturist at: geoff.wilson@gov.sk.ca.

EMAIL ADDRESSES

If you wish to share your email address with the Apiculture Office, send an email to

geoff.wilson@gov.sk.ca

and your name will be placed on the beekeeper contact list. The email list will be used to send out information of importance to beekeepers on a short notice (e.g. winter loss survey, pesticide registrations or updates, etc.).

We welcome all who may be interested. It does not matter whether you are a hobby beekeeper or a large commercial beekeeper, having your email address on file will be a benefit to all.

